DRAWINGS

FOR

APPLICATION

FOR

UNITED STATES LETTERS PATENT

06269-020001

TITLE: ALLOCATING NETWORK BANDWIDTH

APPLICANTS: KENT D. BENSON, ROBERT B. MAGILL, TERRY J. HRABIK and JOHN B. KENNEY

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September 14, 2000
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Samantha Bell
Typed or Printed Name of Person Signing Certificate

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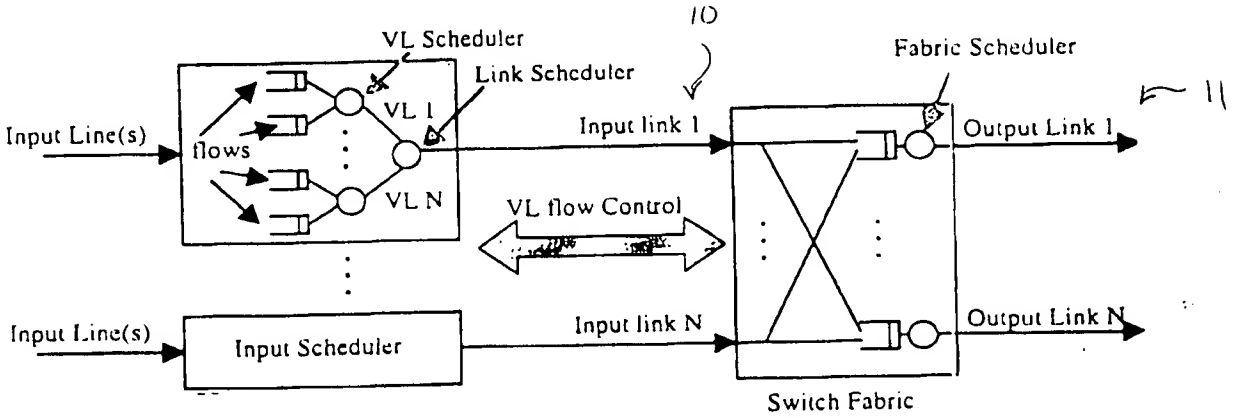

FIG. 1

00hT60°h6T29960

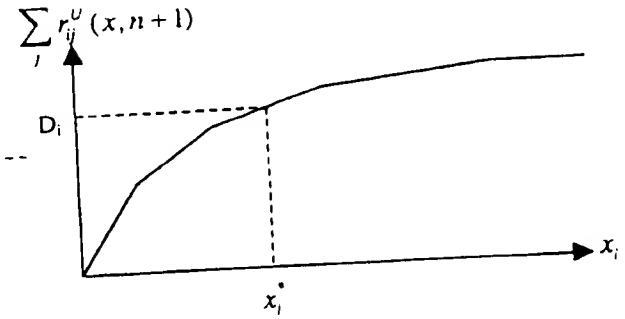

FIG. 2

00hT60"h6T29960

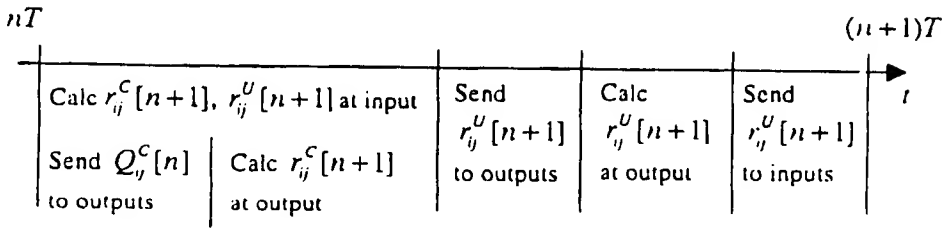

FIG. 3

00760 "h6T29960

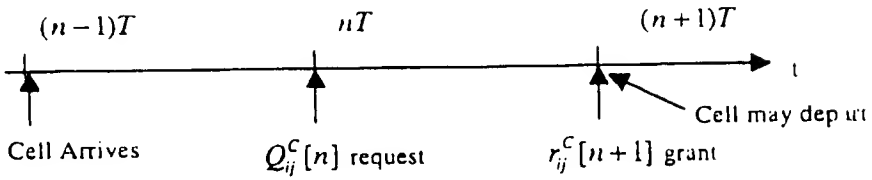

FIG. 4

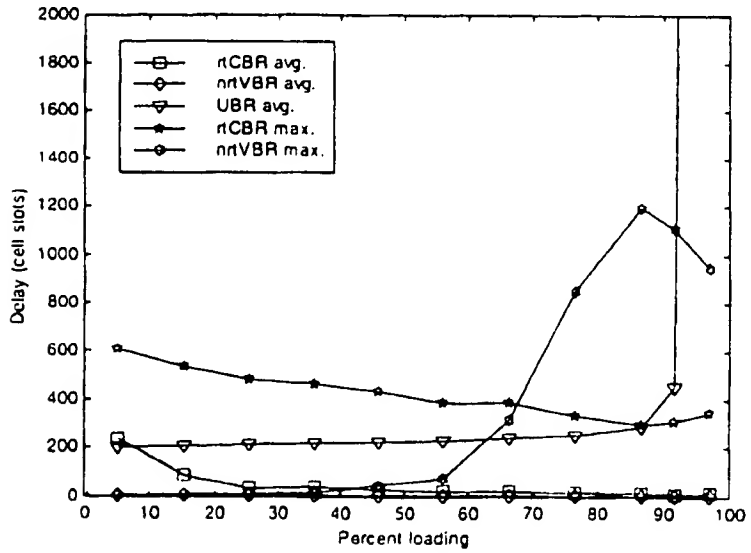

FIG. 5

09662194 . 091400

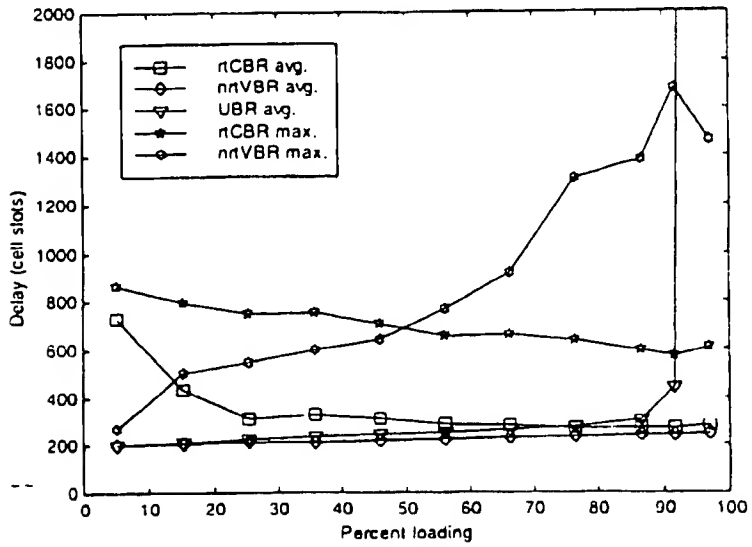

FIG. 6

09662194 . 091400

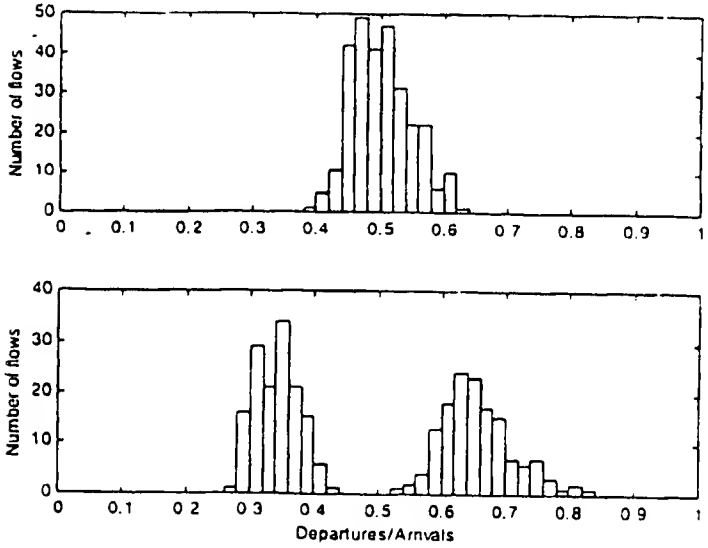

FIG. 7

09662194 . 091400

00T60"T6T29960

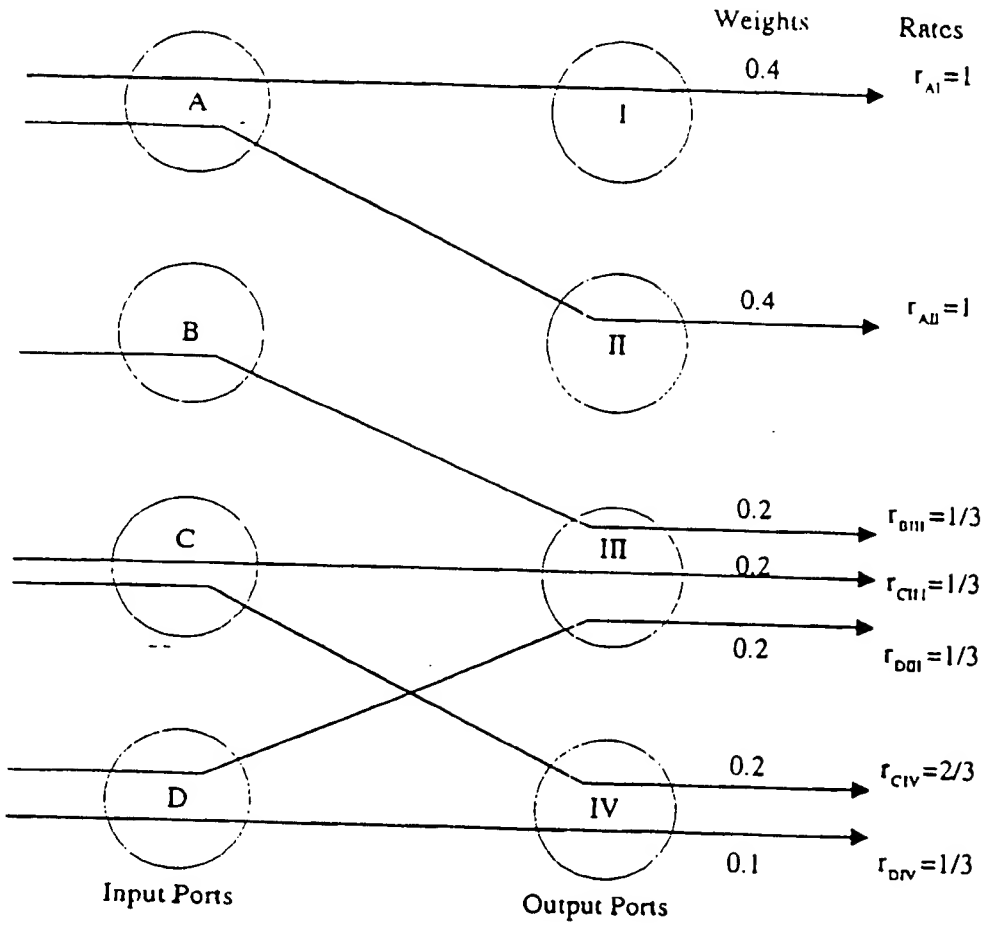

FIG. 8

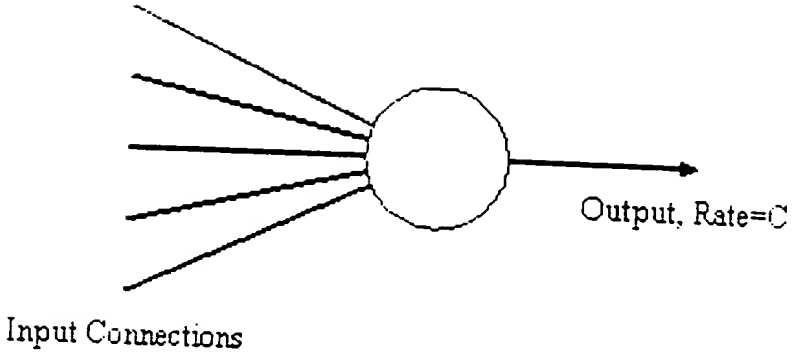
Output, Rate=C
Input Connections

FIG. 9

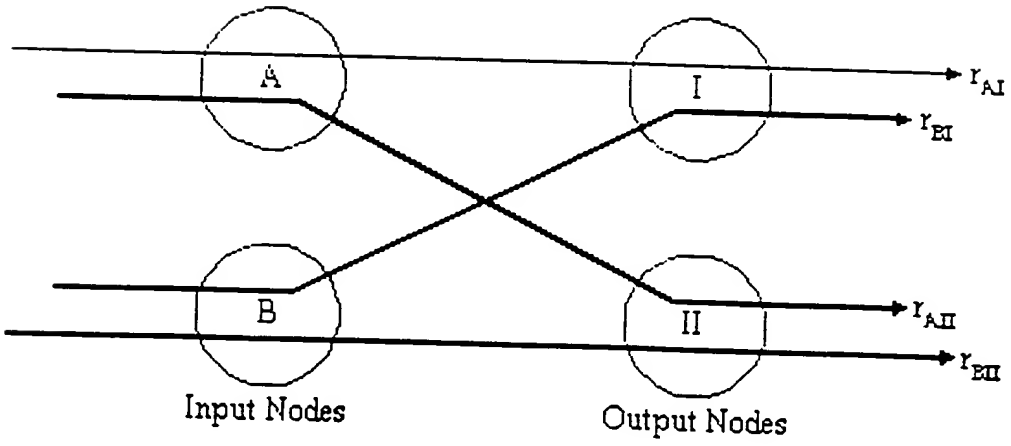
A
I
B
II
r_{AI}
r_{BI}
r_{AII}
r_{BII}
Input Nodes
Output Nodes

FIG. 10

Node A: $\sum_A r_x = r_{AI} + r_{AII} = 1/2 + 1/4 = 3/4$

Node B: $\sum_B r_x = r_{BI} + r_{BII} = 1/2 + 1/8 = 5/8$

Node I: $\sum_I r_x = r_{AI} + r_{BI} = 1/2 + 1/2 = 1$

Node II: $\sum_{II} r_x = r_{AII} + r_{BII} = 1/4 + 1/8 = 3/8$.

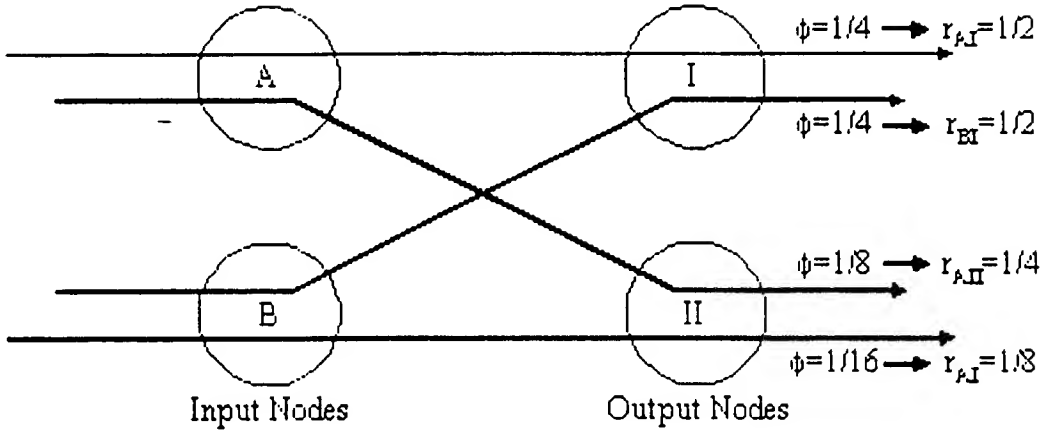

FIG. 11

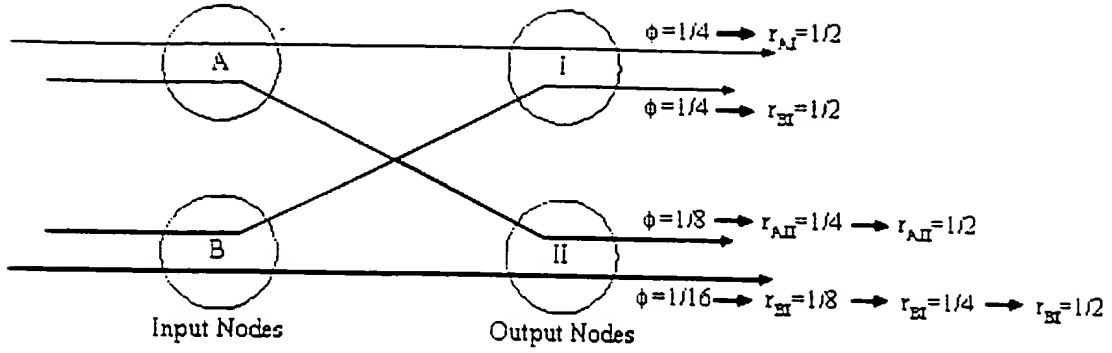
A
B
I
II
Input Nodes
Output Nodes
ϕ=1/4 → r_{AI}=1/2
ϕ=1/4 → r_{BI}=1/2
ϕ=1/8 → r_{AII}=1/4 → r_{AII}=1/2
ϕ=1/16 → r_{BI}=1/8 → r_{BI}=1/4 → r_{BI}=1/2

FIG. 12

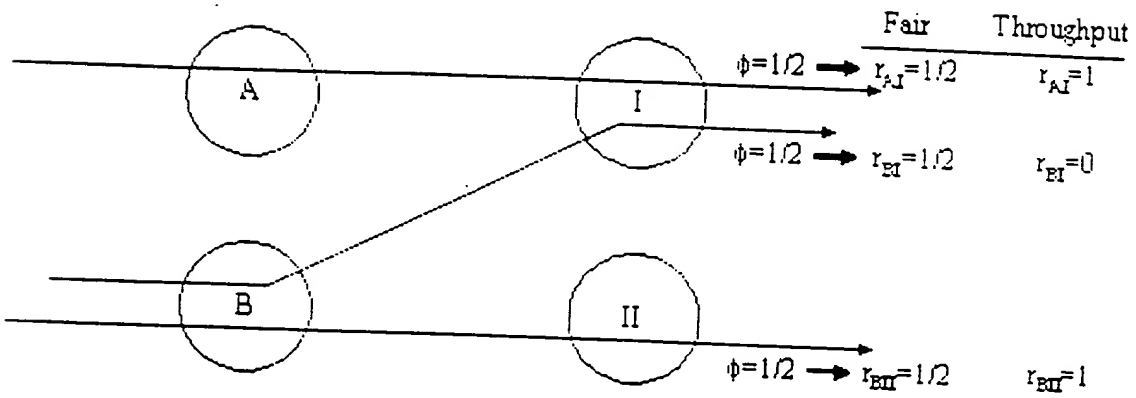
A
B
I
II
Fair
Throughput
ϕ=1/2 → r_{AI}=1/2
r_{AI}=1
ϕ=1/2 → r_{BI}=1/2
r_{BI}=0
ϕ=1/2 → r_{BII}=1/2
r_{BII}=1

FIG. 13

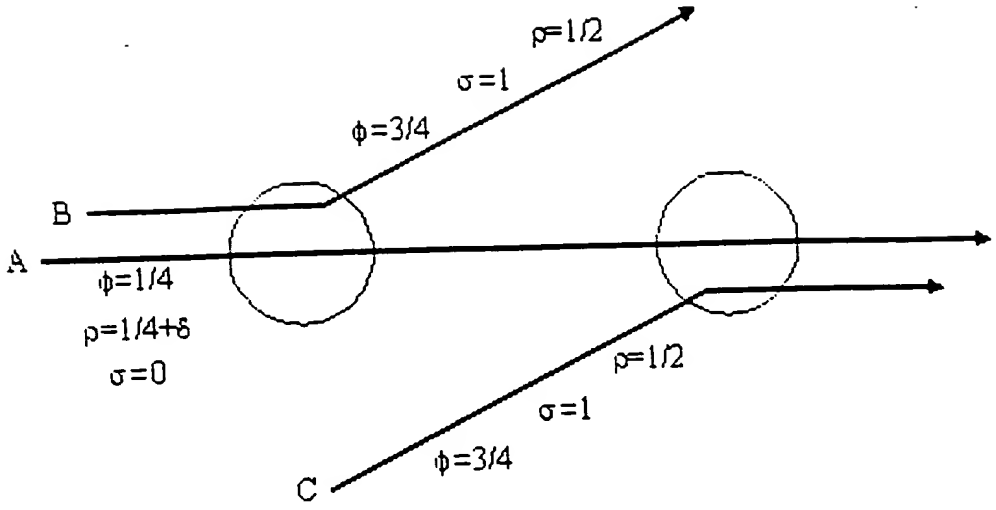
ρ=1/2
σ=1
ϕ=3/4
B
A
ϕ=1/4
ρ=1/4+δ
σ=0
ρ=1/2
σ=1
ϕ=3/4
C

FIG. 14

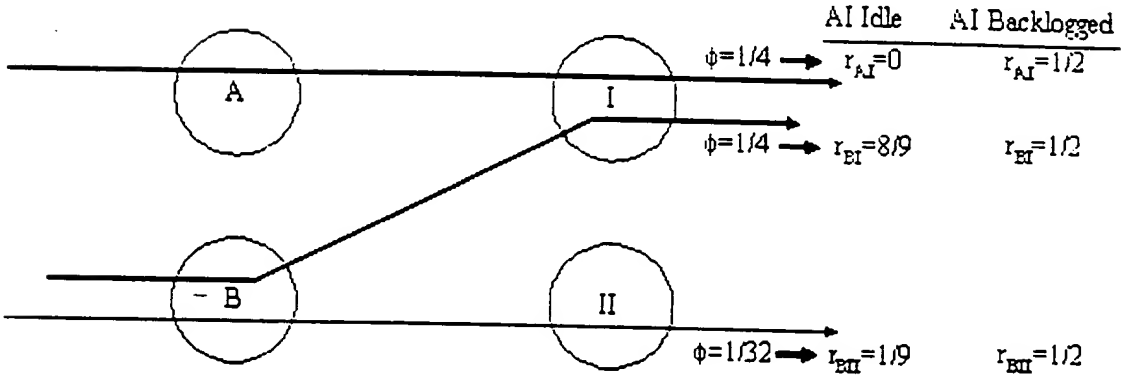
AI Idle
AI Backlogged
A
I
ϕ=1/4
r_{AI}=0
r_{AI}=1/2
ϕ=1/4
r_{BI}=8/9
r_{BI}=1/2
B
II
ϕ=1/32
r_{BII}=1/9
r_{BII}=1/2

FIG. 15

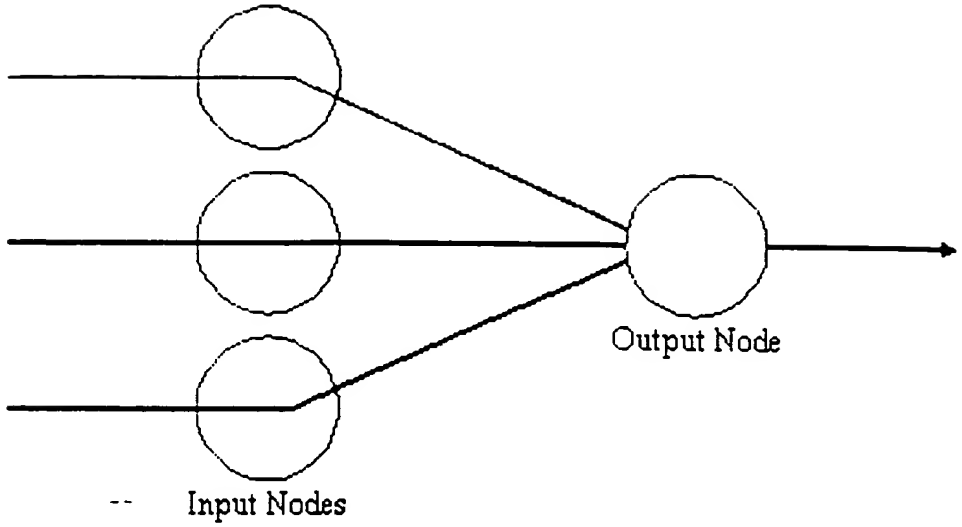

FIG. 16

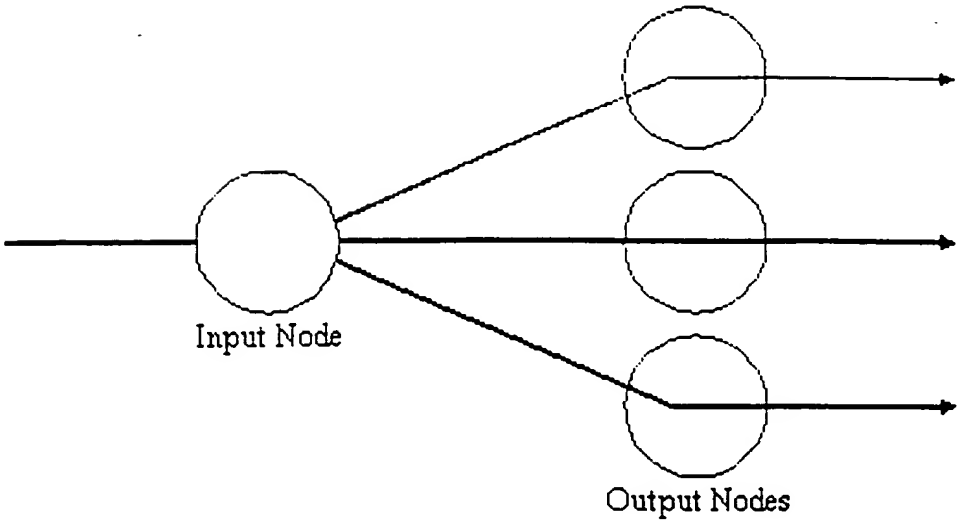

FIG. 17

0094400 - 09621946

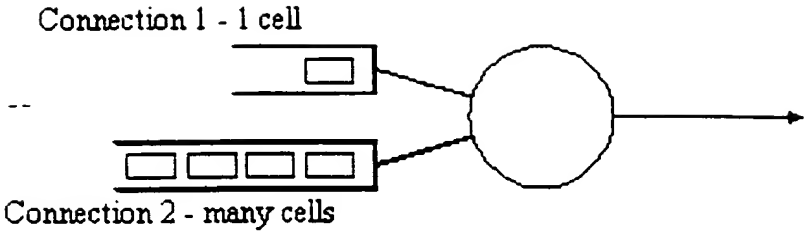
Connection 1 - 1 cell
Connection 2 - many cells

FIG. 18

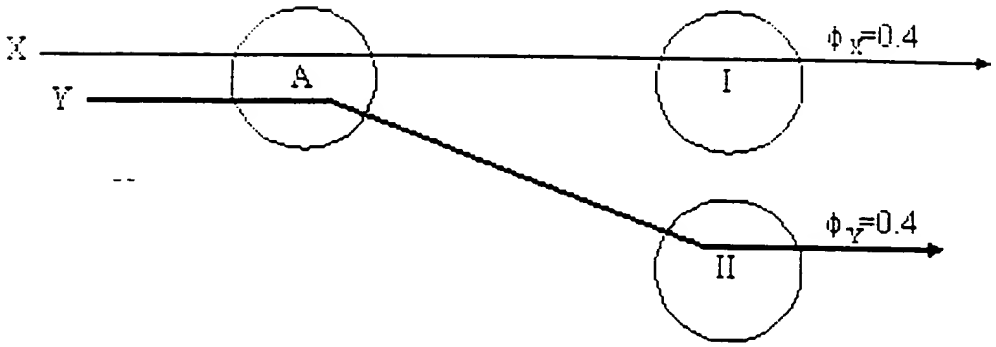
X
Y
A
I
II
ϕ_X=0.4
ϕ_Y=0.4

FIG. 19

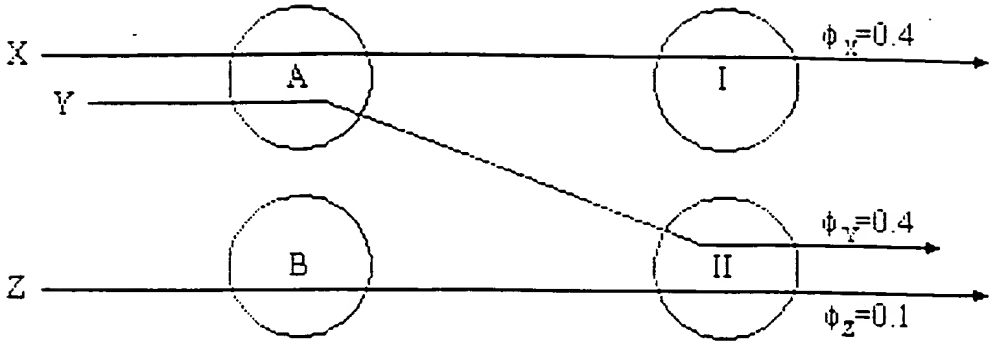
X
Y
Z
A
B
I
II
ϕ_X=0.4
ϕ_Y=0.4
ϕ_Z=0.1

FIG. 20

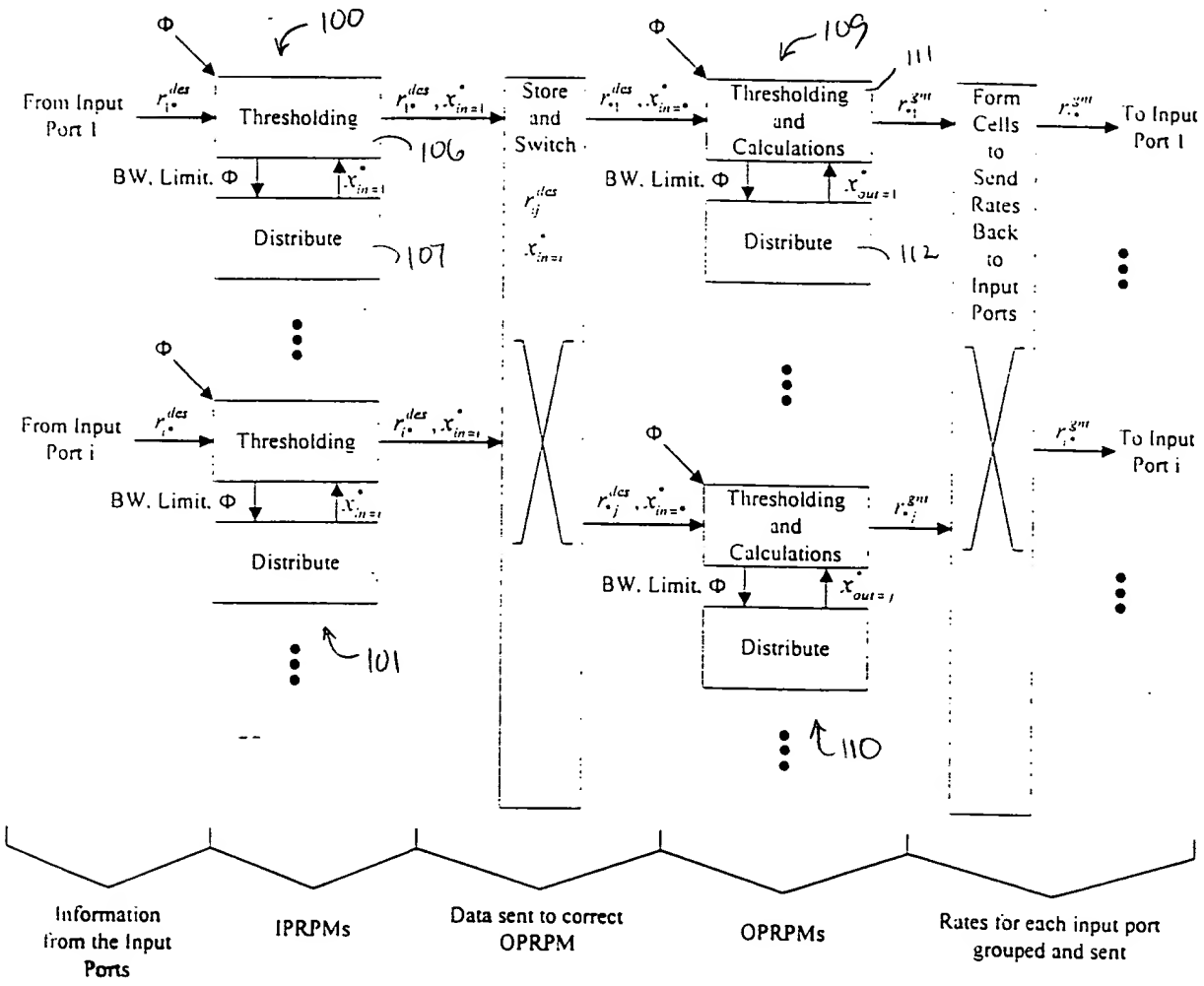
From Input Port I
From Input Port i
Thresholding
BW. Limit. Φ
Distribute
Store and Switch
Thresholding and Calculations
Form Cells to Send Rates Back to Input Ports
To Input Port I
To Input Port i
100
101
106
107
109
110
111
112
Information from the Input Ports
IPRPMs
Data sent to correct OPRPM
OPRPMs
Rates for each input port grouped and sent

FIG. 21

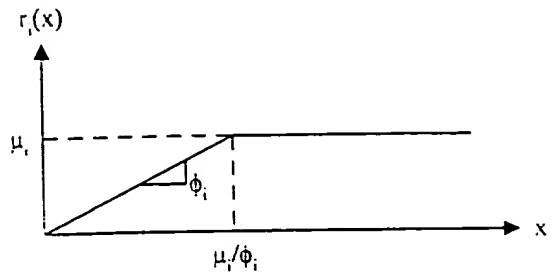

FIG. 22

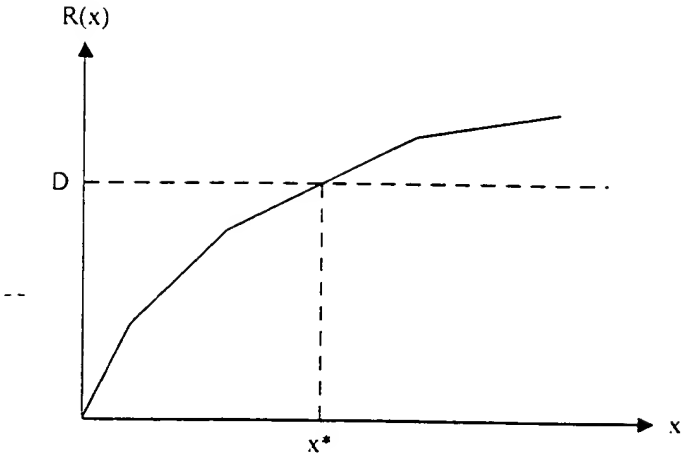

FIG. 23

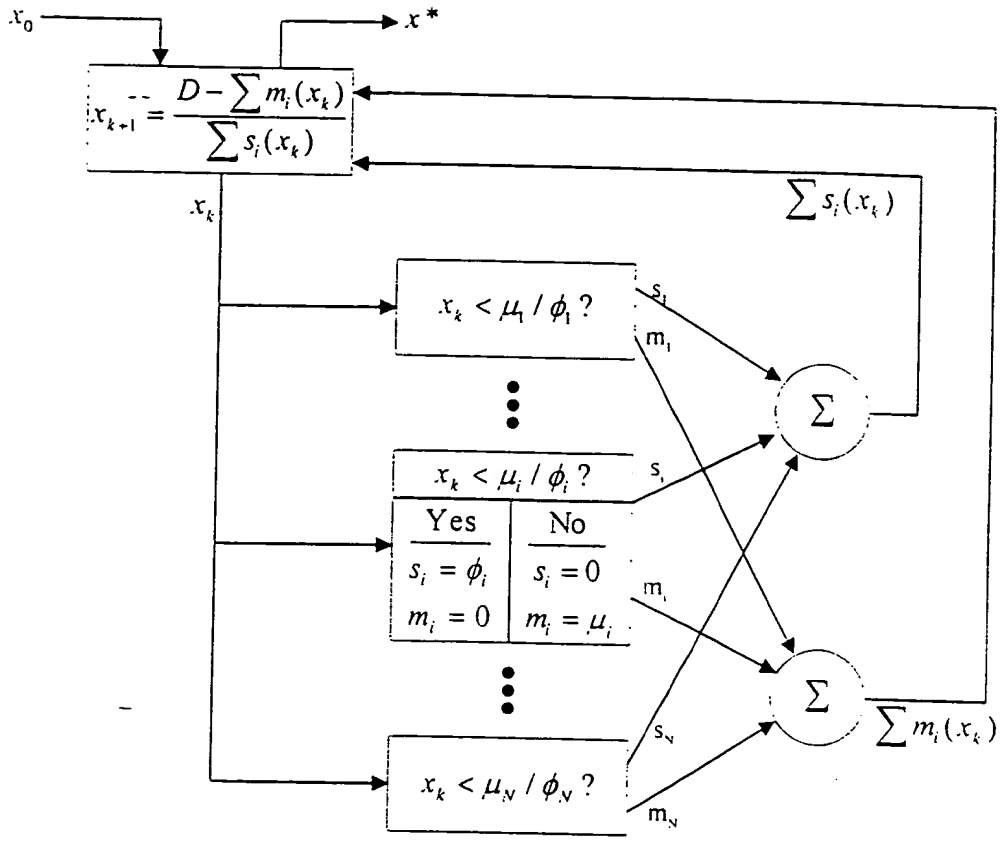
x_0
x^*
$x_{k+1} = \frac{D - \sum m_i(x_k)}{\sum s_i(x_k)}$
x_k
$\sum s_i(x_k)$
$x_k < \mu_1 / \phi_1$?
s_1
m_1
$x_k < \mu_i / \phi_i$?
s_i
Yes
$s_i = \phi_i$
$m_i = 0$
No
$s_i = 0$
$m_i = \mu_i$
m_i
s_N
$x_k < \mu_N / \phi_N$?
m_N
Σ
Σ
$\sum m_i(x_k)$

FIG. 24

00T60"T6T29960

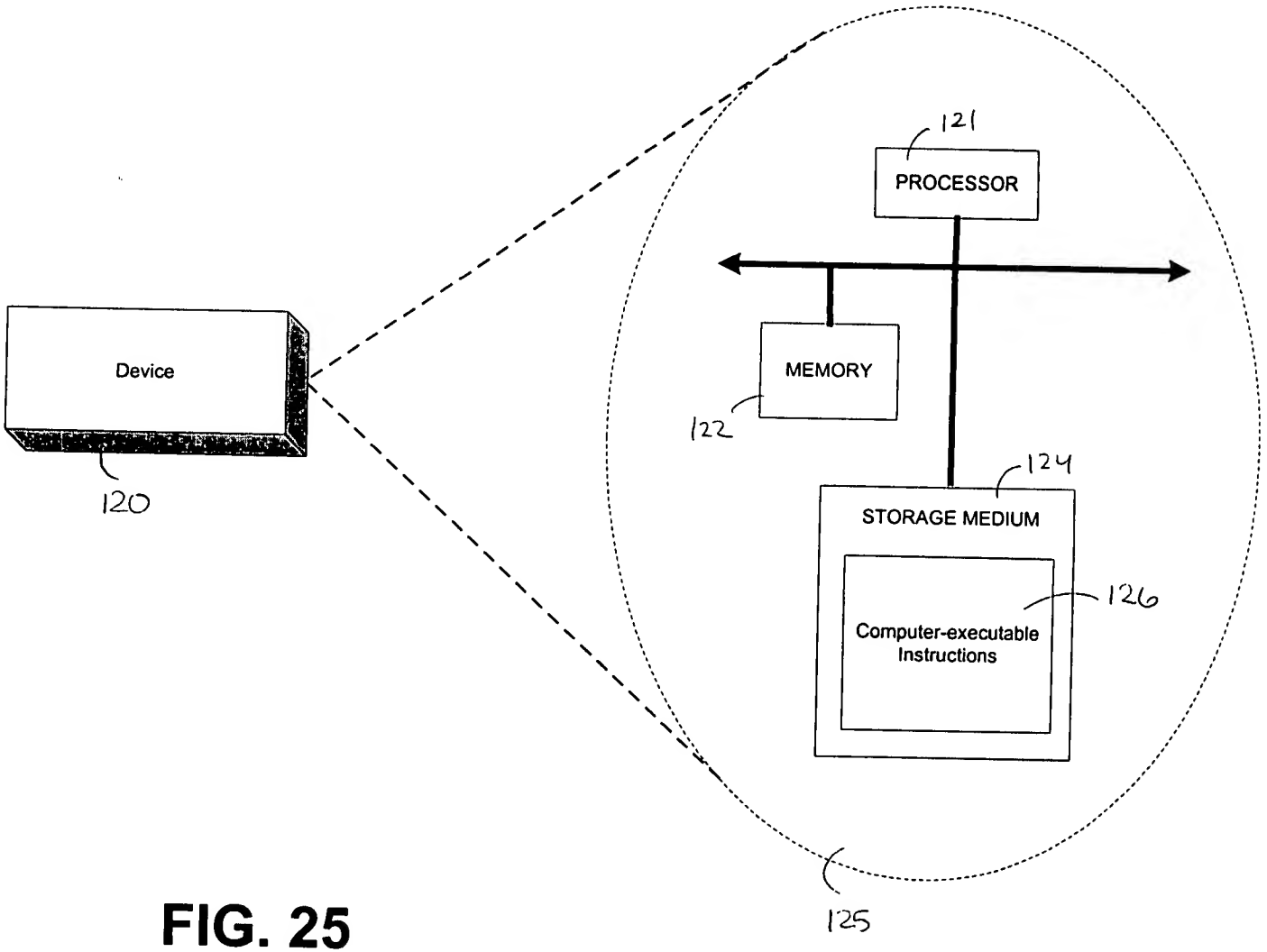

FIG. 25